CALCINED PLASTER

OR

STUCCO.

Manufactured by the

Grand Rapids Plaster Co.,

Is a very superior quality. The Gypsum from which it is manufactured is very hard, fine grained and pure.

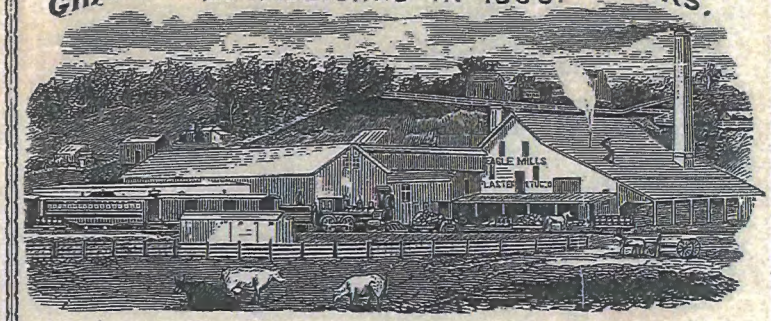
Their works were built in 1856, and incorporated in 1860, and having enjoyed an unbounded reputation for the good quality of their goods, and fair dealings, would invite all in want of their Calcined or Land Plaster to send their orders, which will be filled with promptness.

15c

Grand Rapids PLASTER

AND ITS USES.

GRAND RAPIDS PLASTER CO. WORKS.
ESTABLISHED IN 1856.

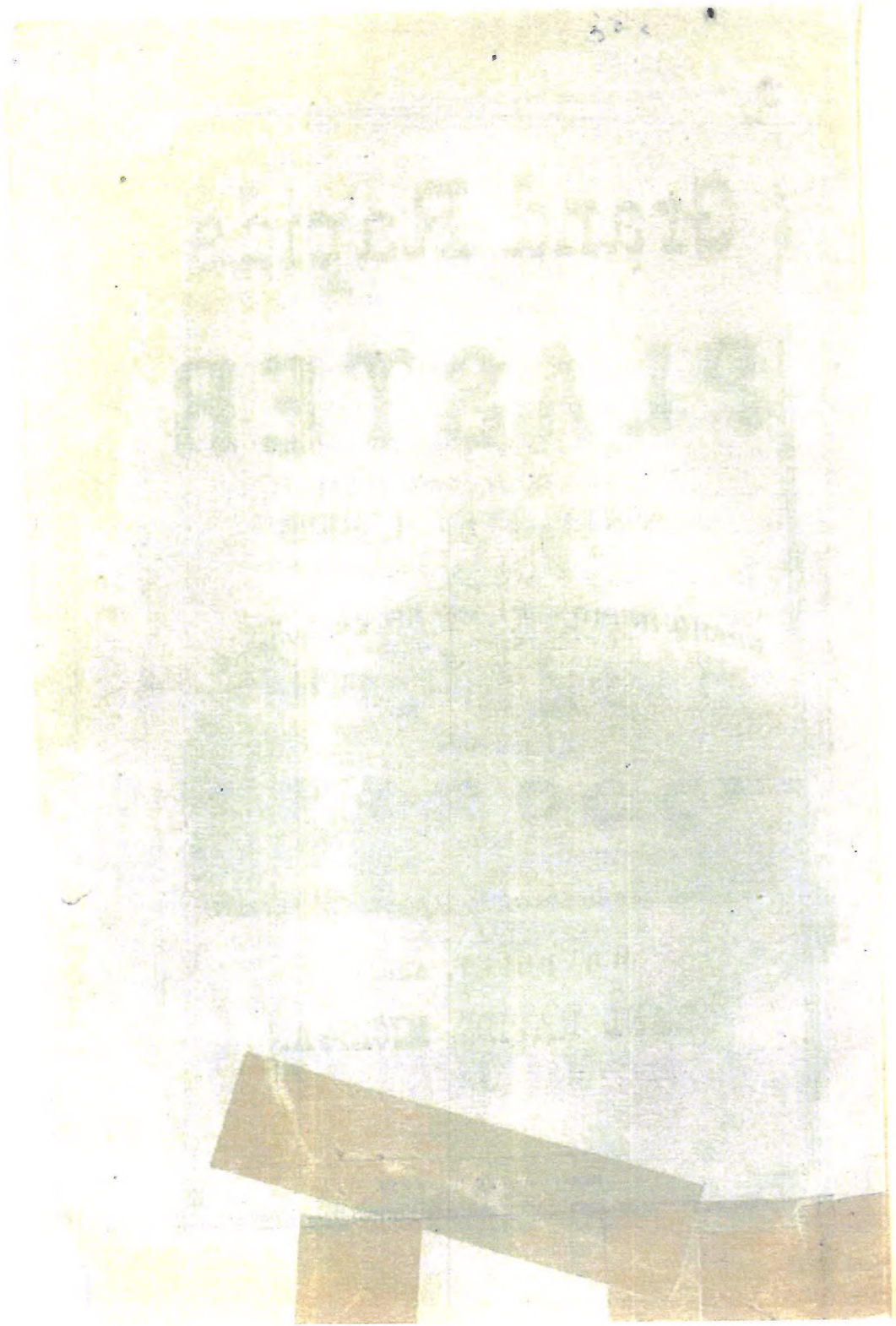


WM. HOVEY, Agent.

GRAND RAPIDS, MICHIGAN.

Eagle Print—W. C. Dennis & Co.

364-28-11



TO FARMERS.

GYPSUM OR PLASTER.

ITS USES AS A FERTILIZER.

For more than a hundred years has Gypsum or Plaster been used as a fertilizer. Benjamin Franklin, it is said, was the first person who introduced it into use in this country. Farmers were skeptical, as many even now are, concerning its value as a fertilizer. In order to force conviction upon their minds, he adopted a method —at once so practical that there could be no escape from the proof which he adduced. It was this: In the presence of a number of them he sowed plaster on a portion of a field of grass, on a hill-side, in the form of large letters—"B. Franklin." After a few weeks time, the grass upon which the plaster was sown had so far outgrown the rest that the letters could be easily read a long distance off; of course there was no escape from such a demonstration as that.

ANALYSIS:

Sulphuric Acid,	- -	46 pounds	in 100.
Lime,	- - - -	33 "	"
Water of Crystalization,	-	21 "	"

"Gypsum is a chemical compound of Sulphur and Lime—so much is agreed; and the theory of chemists has been that, as the winds pass over a surface sown with it, the Ammonia which has been exhaled from a thousand barn-yards, bogs, &c., having a

stronger affinity for Sulphur than lime has, dissolves the Gypsum, combines with the Sulphur, forming a Sulphate of Ammonia, and leaves the Lime to get on as it may. I accept this theory, having no reason to distrust it; and, knowing that Sulphate of Ammonia is a powerful stimulant of vegetable growth (as any one may be assured by buying a little of it from some druggist and making the necessary application,) I can readily see how the desired result *might* in this way be produced. For our purpose, however, let it suffice that *it is* produced, of which any one may be convinced by sowing with Gypsum and passing by alternate strips or belts of the same clover-field. I suspect that not many fertilizers repay their cost out of the first crop; but I account Gypsum one of them; and I submit that *no farmer can afford not to try it.* That its good effect is diminished by many and frequent applications, is highly probable; but there is no hill or slope to which Gypsum has never yet been applied which ought not to make its acquaintance this very year. I am confident that there are many pastures which might be made to increase their yield of grass one-third by a moderate dressing of it.

"I have heard Andrew B. Dickinson, late of Stuben County, and one of the best unscientific, unlearned farmers of our State, maintain that he cannot only enrich his own farm but impoverish his neighbors' by the free use of Gypsum on his woodless hills. The chemist's explanation of this effect is above indicated. The plastered land attracts and absorbs not only its own proportion of the breeze-borne Ammonia, but much that, if the equilibrium had not been disturbed by such application, would have been deposited on the adjacent hills. As Mr. D. makes not the smallest pretentions to science, the coincidence between his dictum and the chemist's theory is noteworthy.

"Now that our country is completely girdironed with railroads, bringing whatever has a mercantile value very near one's door, I suggest that no township should go without Gypsum. Let it be sown so that its effect (or non-effect) may be palpable; give it a fair, careful trial, and await the result. Gypsum has been proved to be one of the best and cheapest commercial fertilizers known to mankind." It has been demonstrated by a hundred years experience in this country and in Europe, and the tens of thousands of tons annually sold at Grand Rapids attest its virtues better than any words of ours can express. But we propose to give some extracts from good authorities, showing its effects and proper application to the various crops of this climate, with some comments of our own; and also show, what few farmers calculate, the profits resulting from its use.

Strange as it may seem, there are a *great many* farmers who can obtain Plaster at a reasonable price (and anything less than fifteen dollars a ton is a reasonable price, when the increased amount of crops resulting from its use, is taken into account,) yet persistently refuse to use it because it *does* increase the growth of the crops to such an extent—claiming that the large crops produced exhaust the soil too rapidly, and, if continued, will soon destroy its productiveness altogether. And so it will unless you give back to the land the elements you have taken from it. Your horse will die if you don't feed him, and the harder you work him without feed the quicker he will die. So with your land—the greater crops you raise without feeding back, the sooner will it become exhausted of its productiveness.

But persons who refused to raise large crops for this reason, are either ignorant of the fact or lose sight of it altogether, viz: that vegetation absorbs in its growth *less than one-eighth* part of its own weight from the inorganic substances of the soil; the remaining portion being compounded of water or the gasses of the atmosphere which are absorbed by the leaves as well as by the roots. In order to establish this point, we quote from *Johnson's Agricultural Chemistry*, p. 178, as follows:

"The inorganic matter contained in different vegetable productions varies from 1 to 12 per cent. of their whole weight.

GRAIN OF	PER CT.
Wheat	1 1-5
Rye	1
Barley	2⅓
Oats	2⅓
Beans	2 1-7
Peas	2½

DRY STRAW OF	PER CENT.
Wheat	3⅓
Oats	5⅔
Barley	5¼
Rye	2¾
Beans	3½
Peas,	5

	UNDRIED.	DRIED IN AIR.
Potatoes	4-5 of 1 per ct.,	2 3-5
Turnips	3-5 "	7
Carrots	3-5 "	5
Parsnips	4-5 "	4 2-5

	GREEN.	IN HAY.
Red Clover	1½	7¾
White Clover,	1¾	9½
Grass,	2¼	9½

The same work given the gross amount of inorganic matter, or earthly substance taken from the soil during a three years course of cropping, viz: 1st, fallow—2d, wheat—3d, oats; if the produce of such course is 22 bushels of wheat and 50 bushels of oats to the acre, at 400 lbs. for the three years. Now the wheat and oats alone would weigh 3100 lbs. beside the straw.

It also gives the effect of a *four years* course of cropping, as follows, viz: 1st, turnips—2d, barley—3d, clover and rye-grass—4th,

wheat. Assuming that the crop, turnips amount to 25 tons of roots per acre—barley, 38 bushels—clover and rye-grass, one ton of hay each per acre, and of wheat 25 bushels—the total amount of inorganic matter taken from the soil is only 970 lbs. to the acre in four years, while the crops raised would weigh over 55,000 pounds.

From this statement it can be easily understood why it is that worn-out land (as Mr. De Garmo says his farm was when he bought it,) by the aid of clover and plaster, fallowing the third year cropping—actually improving the productiveness of the soil while raising larger crops.

In 1869 Messrs. Moore, Foote & Co., of Detroit, offered a premium for the best five acres of wheat raised that year, in this State. Mr. H. E. DeGarmo, of Spring Mills, Oakland County, took the prize, and the following is his statement of his treatment of the soil in accomplishment of the result:

H. E. De GARMO'S STATEMENT.

"The size of the field upon which the five acres is part is 16 acres and 46 rods. Part of it has been under cultivation for 20 years, the balance nine years. It produced clover in 1866 and 1867, and was followed in 1878. It was plowed only once, ten inches deep—three heavy horses being used. It was harrowed twice and sown on the 11th of September. The seed was of the Delhi variety, purchased in Highland, Oakland County, for $2 50 per bushel. It underwent no preparation, and the quantity sown was one and one-half bushels per acre. It was sown broadcast; top-dressed with plaster—50 lbs. to the acre, at a cost of $9 per ton. It received no cultivation after it began to grow; was harvested by hand and threshed with Pitts' thresher. The whole crop compares with the sample, and the quantity realized from the entire field of 16 acres and 46 rods, was 495 bushels.

"I came into possession of this farm nine years ago. It was then so worn-out and impoverished that the former owner had almost abandoned any attempt at raising wheat, but was making a poor attempt at raising rye and the crop of rye on the same 16 acres was so poor that it was not worth harvesting, and the cattle were turned in. The last crop of wheat raised on the farm before I got it was estimated by those who assisted in harvesting it, not to yield over three bushels to the acre. *Now, without any fertilizer except clover and Plaster*, I have no trouble in getting from 20 to 35 bushels of the first quality of white wheat.

"This 16 acre field is composed of one-half of an old, worn-out field (having moved fences to change the size and shape of the new field,) that had been cropped with wheat after wheat for 20 years, until it produced little but cockle and chess. The other half was cleared nine years ago, and the present is the fourth crop of wheat. None of it had borne any other crop to my knowledge. My manner of improving the land is to get as much clover as I can grow upon it and leave it to mulch and protect the land from our scorching sun.

"I do not think there was a gill of rye, cockle or chess in 500 bushels grown. There was nothing but wheat in running 60 bushels through the mill for seed. I do not see one kernel or grain of foul stuff even in the screenings. Had it not been for the cut wheat it would have been good seed right from the separator."

There are hundreds of similar instances in this State where farms have been run down, until the crops were worthless, because the owners were too shiftless to properly cultivate them; or were fearful that the use of Plaster would, *by growing too large crops, exhaust the soil*—which farms have afterwards fallen into the hands of enterprising farmers, like Mr. De Garmo, who, by the proper use of clover and plaster, in the course of four or five years have made them the most valuable of farms, yielding the best of crops.

Mr. De Garmo's statement, also shows the benefit of applying plaster to wheat.

Especially will its benefits appear by its application in the spring to any portions which have been injured or partially killed during the winter—a top dressing of plaster, will in a few weeks show marvelous effects.

Messrs. Dewey and Stewart of Owosso, in this State, practical farmers as well as millers, who cultivate a large farm beside attending to the milling, assure us that they never raise wheat without top dressing it with plaster. They say they *know* by many years experience that with it they can raise larger crops and *better wheat* than without it. They even claim that they can tell by the grain whether plaster was used in the raising, and that they pay a higher price for that raised with plaster because it is better.

RED CLOVER.

The most surprising effects from the use of plaster upon any crop is upon red clover.

Clover is a plant which has great power to take ammonia from the air and appropriate it to itself, and then in its gradual decay, if

turned under so as to prevent its escape of volatile ammonia, will give it up to crops which succeed it; but by the aid of plaster, it will take up a far greater amount, and thus add greatly to its fertilizing quality.

It is proved by scientific analysis, that red clover contains all the elements organic and inorganic of which wheat, oats, rye, barley and other grains, as well as most other crops raised here, and therefore it is the best and most natural manure which can be applied to the land preparatory to raising other crops.

CORN.

A correspondent of the *Rural New Yorker* says: "The past season I used plaster alone on one piece of corn skipping two rows, which I harvested separate, and also two rows each side of the unplastered. This was a triangular shaped field of one acre and one fourth. The corn on the two not plastered weighed 182 pounds; shortest rows, plastered, 224 pounds, or about 100 pounds of corn by using plaster to 73 pounds where not used. There was 150 bushels of corn on this piece.

POTATOES.

Plaster has not been used for a fertilizer for the Potatoe in the newly settled portions of the country, because the new soils would almost always for a few years raise excellent crops of potatoes without it. The past season has however demonstrated the beneficial effects resulting from its use in an unexpected manner. The potatoe bug made its appearance early in the season and plaster was applied to the vines quite generally as a remedy. Excepting when used with Paris green, it had but a partial effect in driving away the bug, but in all cases where it was so applied and the bug did not destroy the vines there was an excellent crop of pototoes although the season was the driest known for many years.

From a prize Essay, on the "Cultivation of the Potato," written by D. A. Compton, of Hawley, Pennsylvania, and published by Orange, Judd & Co., of New York, we take the following, which will be found valuable and timely.

He says, "However much lime or other fertilizers may be applied to the soil, still great benefit is derived from the use of plaster, (sulphate of lime.)

After all, plaster is the main dependence of the potatoe grower, a help on which he may rely with the utmost confidence. Astonishing results are obtained form its use, when applied in a proper manner. The writer has seen a field, all of the same soil and prepared

alike, and all planted with the same variety at the same time, on one-half of which, that had no plaster, the yield was but sixty bushels per acre, and many rotten; the other part, to which plaster was applied in the manner hereafter explained, yielded three hundred and sixty bushels per acre, and not an unsound one among them.

The action of plaster is often puzzling. From the fact that where land has been strongly limed, a small quantity of Plaster applied shows such decided benefit, there would seem plausibility in Liebig's theory that its effects must be traceable not to the lime, but to the sulphuric acid. The ammonia in rain water in the form of carbonate (a volatile salt) is decomposed by plaster, the sulphuric acid having greater affinity for it, thus forming two new compounds, sulphate of ammonia and carbonate of lime. But as arable soil has the same property of absorbing ammonia from the air and rain water, and fixing it in the same or even a higher degree than lime, there is only the sulphuric acid to look to for an explanation of the favorable action of plaster on the growth of plants.

It is found that plaster in contact with soil undergoes decomposition, part of the lime separating from the sulphuric acid, and magnesia and potash taking its place, quite contrary to the ordinary affinities.

These facts show that the action of Plaster is very complex, and that it promotes the distribution of both Magnesia and potash in the ground—exercising a chemical action upon the soil which extends to any depth of; it and that, in consequence of the chemical and mechanical modifications of the earth, particles of certain nutritive elements become accessible and available to plants that were not so before.

It is said that Plaster is of most benefit in wet seasons; such is not always the case. It is certainly beneficial to clover, wet or dry; so of potatoes. A few years since when the drouth was so intense in this section as to render the general potato crop almost a total failure, the writer produced a plentiful crop by the use of plaster alone. On examination at the dryest time, the bottoms of the hills were found to be literally dust, yet in this dust the tubers were swelling finely; the leaves and vines were of a rich, deep green, and remained so until frost—while other fields in sight planted with the same variety, but not treated with plaster, were brown, dead, and not worth digging. That Gypsum attracts moisture may be proved by plastering a hill of corn and leaving a hill by it unplastered; the dew will be found to be deposited in greater

abundance on the plastered hill. But, according to Liebig, certain products of the chemical action of Plaster enter into and are incorporated with the structure of the plant, closing its breathing pores to such an extent that the plant is enabled to withstand a drouth which would prove fatal to it unassisted.

Certain it is that Plaster renders plants less palatable to insects, and, so far as the writer's experiments extend, it is fatal to many of the fungi family. To obtain the best results, the vines of potatoes should be dusted with plaster as soon as they are fairly through the soil, again immediately after the last plowing and hoeing, and, for reasons hereafter given, at intervals throughout the whole growing season. The first application may be light; the second heavier, and thereafter it should be bountifully applied—say two hundred pounds per acre at one sowing.

FRUIT.

We are assured by persons who have rscently made experiments with plaster upon fruit trees, that the effects are plainly perceivable. They state that when it was applied to only one side of a tree, the fruit on that side was larger and better than on the side where it was not applied. It is worth a trial by every fruit grower.

OTHER TESTIMONY.

Mr. Chesebro, on a farm in Rensslaer County, New York, says that "from a piece of land which yielded him the first year of tillage, without any enrichment, but 26 loads of hay, he was enabled in five years tillage *with no other fertilizers than Gypsum (Plaster) and clover*, to take off 300 loads of hay from the same ground.

The editor of the *Western Rural*, in a reply to a correspondent asking the uses and effects of Plaster, says :

Its effect upon clover and other legumanous plants are very mared. Liebig found by experiment *that four pounds of Gypsum produced one hundred pounds of clover*, and that amount of clover will fix in the soil sixty pounds of Nitrogen.

As an improving crop in grain farming, clover should be, and generally is largely depended on; and nothing has been found so effective in stimulating its growth as Plaster, while its relative cost is very light. It requires but a small increase of the crop to pay for a dressing of Plaster. The cost per ton, and of applying it for instance upon twenty acres, giving 100 pounds to the acre, is but $10, or fifty cents per acre. This is, we think, a fair esti-

mate. A less quantity is oftener applied than otherwise. While the indicated price per ton may be less than the average, the cost of application is doubtless, in the main, less than the price we have mentioned. Now, if it costs but fifty cents per acre to apply 100 pounds of Plaster, it is seen that on twenty acres of land an additional yield of 100 pounds of hay to the acre, pays the cost; but the increased yield is usually much in excess of this amount; it is sometimes increased to 500 pounds of hay to the acre, and even more than that. Half a ton to the acre, extra, gives ten tons for 20 acres, and this extra amount of hay at $10 per ton, gives $100—a profit of $90 on the investment.

The effect of Plaster on grain crops is not so marked, but in many cases it serves a useful purpose even with these. It may be set down as a good rule generally, that plaster is beneficial on all grain crops with which clover and grass seed are sown. Many good farmers use it plentifully on corn. Mixed with ashes and hen-manure it forms a very valuable dressing for this crop. It is sown also on winter wheat and spring grains, as well as on corn and clover.

One of the most useful and necessary elements of the manure collected in the barnyard, is Nitrogen. This is largely supplied by the addition to the manure-heap of substances containing heavy acids which will retain the volatile Ammonia. The best and cheapest, so far as yet discovered, are Sulphuric and Muriatic acids, and these are largely contained in Gypsum and common salt."

A PRACTICAL PAPER ON PLASTER.

W. T. Earley, Charlottsville, Va., writes at length on what he calls "this vexed question which has so long perplexed chemists and good husbandmen." He says :

"By observation, it is concluded that plaster acts as a condenser of ammonia, which is found everywhere in the atmosphere, and in all soils to a limited extent; that it holds this most subtile and powerful manure in its grasp; fixes it and gives it out to the growth of plants as they require it instead of allowing the ammonia to pass away and remain unfixed and unadapted to plant growth.

Again, sow upon a dung-hill steaming and giving off ammonia, a quantity of Plaster. Enough! it will stop the escape of gas. Wait awhile until the plaster sown becomes saturated with the gas, and it will again begin to escape. Put on plaster again and it will stop —and so on until all the ammonia is taken up and fixed.

Great losses are sustained in stables, in cess pools, in all animal and vegetable manures, by the escape of ammonia, which constitutes by far the richest part of all manures. Plaster may be most profitably employed in fixing this volatile and most valuable ingredient to the great profit of the farmer, and of the public.

From the Grange Visitor.

Disco, April 1st, 1876.

A worther brother in a previous number of the *Visitor*, propounded some pertinent question in relation to plaster as a fertilizer.—Now, dear *Visitor*, as light is what we are all seeking for on this as well as other subjects that relate to our business as agriculturists, with your permission I will give the views I have acquired by reading, observation and long experience, on the constituent elements of plaster, and the benefits to be derived from its application to farm crops.

In the first place allow me to say that plaster is largely composed of lime, which is generally understood to enter largely into the growth of most of our cereals, especially that of wheat. Hence plaster to a certain extent, is a fertilizer. But Professor Johnson, and likewise Professor Kenzie, of our own State, informs us that plaster is composed of lime and sulphuric acid. Now when lime and sulphuric acid are combined or united, they have a strong attraction or affinity for water, and as they attract moisture from the atmosphere, it necessarily brings along with it some fertilizers as are set free by the decomposition of vegetable or animal substances. Hence, the application of plaster furnishes moisture to the growing crops, but the moisture furnished from the atmosphere brings along with it, ammonia and carbonic acid gas, both of which are powerful fertilizers, and thus enables the roots of clover and other farm crops to penetrate deeper into the unbroken sub-soil, and bring up from below those fertilizing elements that there lie dormant.

It will therefore be seen that plaster not only extracts food from plants from the subsoil below, but it purifies the very air we breathe, and converts the impurities into the growth of our farm crops. But let us not forget that plaster is also a wonderful stimulant, and as such enables the farm crop to draw largely from the vegetable mold or farm yard manure in our soil, which must for ever underlie a high state of cultivation. Therefore, to derive the greatest amount of benefit from plaster, it is necessary to make the soil rich with manure or some vegetable mould, and then apply plaster, and we shall

receive satisfactory results. And while we behold the beautiful working of those laws gleaned from the book of nature, which an All Wise hand has so gratuitously spread out before us for our inspection, let us not forget the source from whence they come.

W. A. Wales.

PLASTER ON CORN.

For years the plaster dispute has been waged among farmers. All were agreed as to its beneficial effect on clover and grasses generally, but the disputed point was as to whether it ever increased the yield of grain.

The subject was thoroughly disgussed at the farmers' institute in 1875. The Van Buren county farmers seemed agreed that plaster applied to the corn or wheat crop induced greater growth of stalk, but no increase in grain. Many farmers in the eastern part of the State thought they had increased the yield of grain by the use of plaster, but the only definite figures given were by F. M. Holloway, of Hillsdale, at the institute held at Coldwater. In 1870 he experimented on a field of 13 acres with different manures, leaving one acre without any fertilizers. the soil was a dry loam and seemed to be the same all over the field. On one acre of this field he sowed 300 pounds of plaster and received 26 bushels of wheat, and another acre without any manure yielded 10 bushels to the acre. Mr. Holloway also tried experiments on a field of corn by plastering one half and on the other half putting no fertilizers. From the plastered portion he husked 80 baskets, and from the unplastered portion 50 baskets of corn to the acre.

The difference of opinion among farmers led Prof. C. L. Ingersoll, of the Agricultural College to make experiments with plaster on corn during the past season, and he has kindly furnished us with the following interesting facts:

PREPARATION OF GROUND.

Nine tenths of an acre was selected in field No. 8, the slope gradual and uniform towards the north. It was divided into 36 equal plats of four square rods each, or one-fortieth of an acre. The ground was plowed May 3, at a mean debth of 7½ inches, the plow turning a furrow averaging 6 inches wide. A jointer was used. The ground was rolled to press down the furrows, then harrowed three times, and rolled again. It was marked in rows four feet apart each way, making eight rows each way, or 64 hills on a plat.

PLANTING AND CULTIVATION.

The ground was planted with the yellow dent variety, seven grains in a hill, on May 15. Nine plats received 2 lbs. of plaster distributed at the rate of one-half ounce in each hill before planting. Thirteen more received a top-dressing of the same amount on May 31, after the corn was up and ready to cultivate.

The corn was cultivated four times, once in a row each way on May 31, June 13, 29, and Aug. 4. It was hoed twice, viz: on May 31 and again on June 15. The corn was thinned on June 31 to three stalks in a hill, so that the same number of stalks were growing on a plat..

The Crop wos cut Sept. 7, and after standing till October 9, was husked. The corn was weighed and cribbed Oct. 23, and the stalks were weighed on the afternoon of Oct. 31 and stacked.

THE AVERAGE RESULTS

were as follows: Corn on unplastered plats, 995¼ lbs. an average of 71.080 lbs per plat. Corn on plastered plats, 1,598¼ lbs.; an average of 72.648 lbs. per plat. This gives a difference of 63.306 lbs. of corn in ear on an acre as ordinarily planted four feet apart each way.

Comparing the plats where plaster was put in the hills with those plats top-dressed, we find a difference of .672 per plat in favor of plaster in hill, or 41.44 lbs. per acre.

Comparing the unplastered plats with those having plaster in the hill, we find an average difference of 2.133 lbs. per plat in favor of plaster, or 90.719 lbs. per acre.

Comparing unplastered plats with those top-dressed, we find an average difference of 1.161 lbs. on each plat in favor of top-dressing, or 49.378 lbs. on an acre.

CORNSTALKS.

The unplastered plats gave a total of 494¾ lbs. or an average of 35.339 lbs. per plat. The plastered plats a total of 824 lbs. or an average of 37.253 lbs. per plat. This gives a difference of 2.115 lbs. on each plat average, or 89.953 per acre in favor of plaster.

Comparing plastered plats, viz.,those with plaster in the hill and those top-dressed, we find a difference of .873 lbs. per plat, or an average of 37.13 lbs. per acre in favor of plaster in hill.

Comparing unplastered plats with those that received plaster in the hill, we find an average difference of 2.549 lbs. per plat, or 108.412 lbs. per acre in favor of plaster.

Comparing unplastered plats with those top-dressed, we find a difference of 1.815 lbs. average on each plat, or 75.962 lbs. per acre in favor of top-dressing.

Prof. Ingersoll says: "We are not to suppose these experiments prove conclusively the beneficial use of plaster on corn, but they are merely an index of what may be done, and if continued for four or five years, as is intended, we may then have data enough to draw definite inferences."

THE GOOD PLASTER WILL DO.

From the Michigan Farmer, 1878.

One of the most reliable that we know of was tried for three years in succession at the Agricultural College, commencing with 1864, and conducted under the superintendence of Dr. Kedzie himself. The whole series of experiments comprised several kinds of top-dressing, and a plot of ground on which there was no application of any fertillizing matter, and which served as an example of what the soil produced in its unaided or unfed condition. The several plots were numbered as follows. each plot containiug 72 square rods:

1. No top-dressing.
2. Plaster at the rate of two bushels per acre.
3. Wood ashes, five bushels per acre.
4. Muck pulverized, twenty loads per acre.
5. Muck pulverized, twenty loads and three bushels of salt per acre.
6. Salt, three bushels per acre.
7. Horse manure, twenty loads per acre.
8. Cow manure, twenty loads per acre.

We only deal at the present time with the plots that had no application of fertillizers, and the plot that was dressed with plaster.

In 1864 the dressings were applied from the 5th to the 10th of May, and the grass which was timothy and clover sown the year before with oats, with the soil light and no manure having been used on the field, yielding where nothing was used 2.856 lbs. of hay per acre cut by a mowing machine, and cured in the ordinary way in small cocks, and drawn in on the 20th and 21st days of June, and weighed on a Fairbanks scale. The plot No. 2 dressed with two bushels of plaster, yielded the same way at the rate of 3.917 lbs. per acre, or a gain of 37 per cent.

In 1865 there was no additional top-dressing with any fertililzers. Plot No. 1 which had nothing yielded 1.867 lbs. per acre, while the plot plastered in 1864, gave a yield of hay weighing at the rate of 2,933 lbs. per acre, or a gain of 57 per cent. over the one with no plaster.

In 1866 the plots were untouched, and the grass was allowed to grow. The clover had mostly disappeared, and the timothy was in the ascendant. The plot that had had no top-dressing yielded in the third year from the sowing 1,388 pounds of hay, or a little over two-thirds of a ton, while the plot along side of it which had in 1864, two bushels of plaster, worth about 60 cents, yielded 1,721 pounds of hay, or 23 per cent. more than the plot which was in its natural state.

Taking the three years, and we find that the unplastered plot produced altogether at the rate of 8,740 pounds, about 3½ tons of hay per acre for the whole time, while the plastered plot gave a yield of 13,226 pounds, or six tons and five-eighths per acre, or a gain over the unplastered of 4,484 pounds, a gain of 51 per cent. per acre, or really the two hundred weight of plaster applied in 1864 at a cost of 60 cents had yielded a return of two tons and a quarter of hay.

Now these are the reasons which we give for the sowing of plaster on light grass land, and for sowing plaster as early as possible, and we also recommend that it be sown with a machine. When such a return as this is secured, the use of a good machine that insures a regularity of sowing at the right time is really nominal, and as for the plaster, its price this season makes it the cheapest material which can be sown on grass lands.

GYPSUM FOR CORN, CLOVER, &c.

The *Country Gentleman* publishes the following letter, from the venerable John Johnston, of Geneva, N. Y., under date of Nov. 4th, 1875, giving his experience with plaster. Mr. J's opinion on this, as well as other farm experience is always of great value.

I have used plaster every year since I came on this farm, now fifty-four years, and it has done wonders for me on corn, clover and grass. I had never heard of plaster until I came to this country, and thought it impossible that one bushel per acre could have effect on clover or grass.

The first I used was on corn, soaking the corn in water, then mixing plaster with it when wet. I planted that rolled in plaster; a hired man planted the same without plaster. As soon as the corn was up, I noticed the plastered was much the darkest green, and it kept ahead of the other greatly, and when ripe a blind man could have told the difference by feeling the stalks and ears. I have plastered all pastures and mowing ground ever since. I often left

strips not plastered to see the effect. Cattle and sheep would not eat the unplastered so long as they could get enough to eat on the plastered.

I have always used it on meadow and pasture lands to great profit, but have noticed on black muck soil and on wet soils it did no good. I have always said that on the greater part of my farm I would use it if it cost forty dollars per ton.

PLASTER AS A FERTILIZER.

From the New York Independent.

A correspondent of the New York *Tribune*, writes that about thirty years ago his father had three acres in clover. About half was fresh-looking. rank and large; the other half was short, tawny yellow, with dead and punctured leaves. He could not remember any treatment of the land that could have made the difference; but afterward recollected that three years previous he had corn there, when, having two-thirds of a barrel of plaster left, he put it on as far as it would reach—and then, three years after sowing, it more than doubled the yield of clover. Subsequently, the adjoining field was in clover; and at growing time—in the month of June—standing on a knoll about 200 yards distant, every row where the corn had been plastered five years before, could be distinctly traced. This proves that this cheapest of all fertilizers is the most permanent in its effect.

At a late meeting of the New York Farmers' Club, W. M. Tomlinson of Urbana, N. Y., asked the savants to reconcile the difference of opinion which prevails as to the proper way of sowing Plaster with grain crops—some choosing to drill it in with the seed while others prefer to scatter on the surface after the seed is sown. "It is claimed that by putting it in with the seed, it helps the crop from the outset, giving it a start which keeps it ahead of surface-plastered crops. On the other hand, it is argued, that as the principal gain in the use of Plaster is derived from the atmosphere, surface application best secures this—and hence it is to be preferred. What says practical science? Would the answer vary with different soils?

Mr. Curtiss said: "As Plaster is and absorbent of Ammonia it is better to sow it on the crop and let the rain following wash it down to the roots. This is a gain to the plant, for if put into the ground it will absorb the Ammonia in the soil which is already

there; or it must wait for exposure to the surface to do its full duty—which exposure might not take place until the next crop.

"Plaster does but little good on wet ground, and its benefits vary considerably one season with another. Sometimes its effects are almost marvelous, and then again they cannot be seen. On dry loam or gravelly soil, sown on clover, it often doubles its crop. In Glennville, New York, lands rejected fifty years ago as worthless now are, *by using clover and Plaster, worth* $100 *and* $150 *per acre.*

"Sow Plaster on the manure heap and in the hen house."

From an excellent editorial article on the uses of Gypsum or Plaster, in the *Prairie Farmer* of date March 20, 1872, we make the following extract:

* * * The most astonishing results, however, have been noticed in the different varieties of clover. Not only has the yield in many cases been doubled, but it has been found that the plants either green or dry, are better relished by all kinds of stock. It has also been exclusively shown that clover will remain much longer in soils that have been treated with Plaster. Now, when we consider that clover is one of our most valuable forage plants, as well as the crop that is chiefly used for turning under, especially as a means for preparing soils for a crop of wheat, it is plain that we cannot attach too high an importance to this mineral fertilizer.

It is not claimed that Plaster exerts much influence on the wild grasses of our prairies, but in relation to its use on pastures that are cultivated grasses, Mr. Flint says: "In one instance within my knowledge, a large pasture which had become worn and somewhat unproductive, received a generous top-dressing of Plaster. The grass started sooner and continued throughout the season to look far better than the adjoining pastures of precisely the same soil. So far as could be ascertained, the increase of grass over the adjoining pastures was about seventy-five per cent. Nor was this all: The pasture came in the next season with the greatest luxuriance, and its look of beautiful green was the wonder of the whole neighborhood."

The ordinary and perhaps the most approved method of applying Plaster to clover is to sow it broadcast, at the rate of from one hundred to two hundred pounds to the acre. Most prefer to sow it in the morning, when the air is still, and at that time of the spring when the young plants have put forth their first leaves. Many in seeding down fields to clover with spring grain, mix the Plaster with the clover seed at the time it is sown. It would seem to be a

good idea to sow half the amount required for an acre at that time, and to sow an equal amount after the grain is out. It is better to scatter a small amount of Plaster annually on the fields, than to add a large dose at one time, as in the case of applying lime. On pastures it should be applied when the ground is moderately dry, and after vegetation has taken a good start in the spring.

PRAIRIE LAND.

That even our Western Prairies and bottom lands are demanding some fertilizing agents beyond their natural resources, is becoming apparant to the Illinois farmers, is well shown by a correspondent of the *Rural New Yorker*, in an articie signed "J. C. B." and dated at Galesburg, Illinois.

He says: "Although it was common a few years ago, to hear persons boldly assert that the *prairie* soil would never *wear out*—that the vegetable nutrition possessed by these lands was perfectly inexhaustible,—a man would have to travel far, and interrogate closely, to find an individual who preaches this doctrine at the present day." Any one acquainted with the products of Western soil for the last twenty years cannot fail to see that, in the yield of every *kind* of crop susceptible of cultivation here, there is a falling of at least one-third."

On this subject, Horace Greeley, in his work on "What I Know about Farming, says:

"I do not know a rod of our country's surface so rich in *all* the materials which enter into the production of the Grains, Grasses, Fruits and Vegetables, which are the objects and rewards of cultivation, that it could not be improved by the application of fertilizers if there be such, I heartily congratulate the owners and advise them not to sell. Nor do I believe that there are many acres so fertile that they would not produce more Indian Corn, more Hemp, more Cotton, and more of whatever may be their appropriate staple, if judiciously fertilized. If there be farms or fields originally so good that manure would not increase their yield, I am confident that the first half-dozen crops will have taken this conceit out of them. Prairies and river-bottoms may yield ever so bounteously: but that very luxuriance of growth insures their gradual exhaustion of certain elements of crops, which must needs be replaced or their product will dwindle. Whoever has sold a thousand bushels of grain, or its equivalent in meat, from his farm, has thereby inpoverished that farm, unless he has applied something that balances its

loss. 'I perceive that virtue has gone out of me,' observed the Saviour, because the hem of his garment had been touched; and every field that had been cropped might make a similar report whenever its annual loss by abstraction has not been balanced by some fertilizer. The farmer who grows the largest crops is the most merciless exhauster of the soil, unless he balances his annual drafts (as good farmers rarely fail to do) by at least equal re-enforcements of the productive capacity of his fields."

At is abundantly shown in the experience of practical farmers, quoted in the foregoing, and which are only instances among thousands of the same character not put upon record, that the *best fertilizer* for most soils, is clover and Plaster—or Gypsum, which is the scientific name. Because clover contains in its ingredients more of the elements which have been taken from soils by exhaustive cropping, than any other one thing, and in order to raise clover successfully you must use Plaster.

The Wisconsin farmers are beginning to realize these facts and year by year the demand for Plaster in that State is increasing.—Illinois, Indiana, Missouri and Kentucky farmers will soon awake to its importance and the sooner they do so the better for them.

PLASTER—SOME FACTS ABOUT ITS USE.

N. Y. Tribune, 1878.

An Indiana correspondent writes us that he had "one hundred acres of stiff clay which was in an exhausted state from continued cropping of wheat and exhaustive power of weeds, and by being plowed when wet during a period of twenty years. He kept it in grass, clover and wheat, adding a little manure and applying gypsum annually until a crop of thirty-five bushels of wheat to the acre was the result." He also says: Plastered clover, plowed under, as a green crop, is the best and cheapest preparation for wheat; and the clover roots, where plaster was used, penetrated the subsoil to a depth of three feet or more."

Another correspondence writes us from southern Illinois as follows: I find gypsum a profitable investment, and regard it as one of the best aids, in conjunction with growing clover, to restore old and worn out lands that we have. I sow a barrel of it, about three hundred pounds to the acre, as early in the spring as possible. The cost, delivered here, is very small. Before beginning to use gypsum, the yield of corn was twenty-five bushels to the acre. It

is now over sixty. I let my land lie in clover three years. I cut the first crop of the second year's growth for hay when in blossom, and the second crop later in the season for clover seed. The third season I pasture the field, and break it up after harvest and sow in wheat. Each season the field receives its regular amount of gypsum in the spring."

A Wisconsin farmer states that he sowed one and a half bushels of gypsum per acre on a field as late as the 20th of May, and increased the yield fully three times what it was on the adjoining field, the circumstances being similar. Where he applied a heaping tablespoonful of gypsum to corn in the hill, the spot where it was applied could be seen in a crop of wheat which followed.

In the foregoing statements, more than the necessary quantity needed per acre has been used. Sixty to one hundred pounds per acre is all that will be likely to be assimilated by the wheat or clover plants in ordinary seasons. It should, however, be sown by the last of February, or at all events, by the first of April, so that the rains will in part dissolve it. It should be sown broad-cast, in the morning or evening, upon the dew or upon a light fall of snow, when the weather is calm. It does not follow that because one hundred pounds of gypsum will produce ten times that weight in clover that it would pay to increase the quantity sown per acre.

CLOVER AND PLASTER.

Their Value on Wheat—Clover as a Green Manure—Effect of Plaster on Clover.

Michigan Farmer, March 1st, 1877.

An old friend of ours writes that he would like to know what the value of an acre of clover is worth to turn under for the next crop of wheat or grain. The question is one of those vague ones, which include a good deal of inquiry to get any definite, reliable answer that can be used as a general rule by which the value of either clover or plaster can be measured. Still there are some data by which an estimate may be made that will approximate to the truth. When we were at Volinia, we happened to say that growing wheat by means of clover and plaster alone was one of the most expensive methods by which that crop could be grown; and the consequence was that one of the members of the club, and an experinced farmer, also stated he had found quite the contrary. Now, we did not disagree, though it seemed as though we did. The wheat grower on

the loose, mellow, gravelly soils—the burr oak loams—of that district, found that instead of a bare fallow, he could grow clover and plow it under and it nearly doubled his crop of wheat. In the extensive fields, so well fitted for grain, that had grown wheat after wheat for so many years, the actual produce of wheat was but little 16 to 20 bushels per acre. By seeding with clover, and using plaster on the clover, and plowing in the crop, the production of wheat ranges from 25 to 35 bushels per acre. It was found also that when the clover was allowed to run to seed, and neither fed nor turned under until it had matured its seed, that the field continued then to produce a clover crop, without being reseeded, and that the plaster was a great aid in producing a luxuriant crop to turn in. Now here we learn in this rude way, without any rule or measure, that the clover plowed under had increased the yield of wheat *in these soils* about 75 to eighty per cent; where from 16 to 20 bushels were grown to the acre there were crops of 30 to 38 bushels, and even some of 40 bushels. From this it will be seen that under these circumstances, especially of soil, the clover may be credited with all the increased yield of wheat, or a range of 14 to 18 bushels.

But while the clover is credited with this effect on the yield of wheat, we want to know something of how much the clover itself owes to the application of plaster. Here is where we are in considerable uncertainty as long as we depend on the mere observation and estimates of farmers. The weight of clover, root and crop, which these western Michigan soils will produce without plaster, is an unknown quantity, and so also is the amount which they will grow when fertilized by the application of one hundred pounds of plaster to the acre. Still we can come pretty near it.

In 1864 R. C. Kedzie reported on a piece of ground in the College Park that had been seeded with clover and timothy for the purpose of testing this question, as to the benefit occasioned by the application of plaster and some other fertilizers and manures. One of the plots into which the piece of ground was sub-divided was left without any manure, or other application—just in its natural condition, the whole lot having been sown with oats, without any manure, the previous year, when the grass seed was sown. This plot that had no application whatever, was mowed twice, and the plastered plot was also, and it yielded the following amount of dried grass or hay, duly weighed as it came off the field, calculated per acre.

First Cutting,	2,856 lbs.
Second Cutting,	1,742 "
Total,	4,598 lbs.

The piece of ground that was plastered at the rate of two bushels per acre, produced as follows:

First Cutting,	3,917 lbs.
Second Cutting,	3,056 "
Total,	6,973 lbs.

The increase caused by the application of plaster was, therefore, 2,275 lbs. or nearly one-third. In other words, the soil without plaster yielded 2½ tons of hay, mostly clover, and plastered at the rate of 2 bushels per acre its yield was 3½ tons.

Hence we may estimate that the effect of plowing under a crop of clover for the purpose of growing wheat, that had been grown with the advantage of a top-dressing of plaster, would be equal to one-third the increase of wheat on such land, or the price of six bushels of wheat with an equally increased amount of straws. When clover is grown merely to be plowed in, as every one knows it is on many wheat growing farms, there is an immense amount of vegetable substance brought intimately in contact with the earthy and mineral material of which the soil is composed, and the larger the crop the more freely it must act. If plaster increases the crop above ground 75 per cent. as we have shown here, it must do the same for the roots and all those parts of the plants which grow and increase below the surface. Of all the plants grown as crops in this State the clover has much the largest amount of roots; and the heavier, the crop above ground, the greater is the crop of the roots that support that growth. A series of actual comparative experiments and examinations in Germany, resulted in showing that red clover left in the ground when the crop was taken off at the rate of 8,500 lbs. of roots to the acre, to the depth of 10½ inches of the soil. As we know that clover roots in the rich, gravelly loams of such counties as Cass and St. Joseph will penetrate to the depth of four feet and more, it will readily be seen that the amount of roots is really much larger; and that the amelioration and change affected at considerable depths by rendering the soil adapted to nourish vegetation at such depths, must have a direct effect on the grain crop that follows. This must especially affect the growth of the wheat plant very favorably, as it is well known that the fibrous roots of wheat will seek nourishment in a mellow soil to depths almost as great as those at which the roots of the clover are found. Hence it will be seen, while plaster promotes the increase of the clover plant enormously

above ground, it also does fully as much if not more below the surface. It may be estimated that a full crop of clover, used solely as a green crop to enrich the soil, and weighed in its dry condition, or as we would hay, gives to the land about three tons of vegetable matter above ground, and 4½ tons of vegetable matter that is in the roots to the depth of 11 to 12 inches below the surface. Then all this vegetable matter is evenly spread and distributed, and at least one-half of it is so completely and naturally arranged and mingled with the soil that we cannot by any possibility improve it. Our readers will readily see that this green crop manure is not such a very heavy one as they suppose it ought to be; for seven or eight tons of vegetable matter to the acre is not by any means more than a very medium amount of manure. Hence it is just as important that clover should be grown heavy when used to be turned in, as when it is to be used for hay or for pasture.

It is found that a top dressing of plaster will only do a certain amount of service, and that it makes little or no difference whether 100 lbs., 200 lbs. or 300 lbs. per acre has been used. The soil can only use so much in a single season, and just as heavy crops are grown when 100 lbs. are used, as when twice or three times as much are spread. The results of experience are that the clover should always have a dressing of plaster to the amount of 100 lbs. per acre as early in the season as possible, and in some cases it has been advantageous to sow fifty pounds of this in the fall and fifty pounds in the spring. Hence the general rule is that one ton of plaster will serve for twenty acres of clover. We would have it for this purpose even if it cost $10 per ton, or at the rate of 50 cents per acre It will be seen that according to the trial at the Agricultural Col, lege in 1864, and for several succeeding years, the application of plaster increased the crop fully one-half, so far as the yield of hay was tested, and it will readily be admitted that the clover roots must have been fully as greatly increased. Then the testimony of the farmers is that where clover is used as the alternate crop, to prepare land for wheat, the better the clover the better the wheat. Hence the value of the plaster as a special applicant, and an aid in doing a service to the soil in growing clover, and in aiding to furnish nitrogenous matter for the young roots to feed on at a period when they must necessarily be near the surface. It is in this way that plaster aids clover; it enables the young plant to grow foliage by which the roots are furnished with the growth that sends them rapidly down in search of the food the plant needs to make its quick increase both above and below ground.

PROFIT FROM THE USE OF PLASTER.

Michigan farmers who have had experience in the use of Plaster, generally admit that in all ordinary seasons they can raise half ton of clover or grass more to the acre, by sowing one hundred pounds of Plaster on it, than they can without. We have questioned dozens of farmers upon this point, and, with but one or two exceptions, all admitted they could raise half ton of clover or grass, more to the acre by using Plaster than they could without it. Now, look at the profit: One ton of Plaster cost the Michigan farmer from three to six dollars—according to the distance from the mines. Now, one ton of plaster at one hundred pounds to the acre, will sow twenty acres—which will give ten tons of hay extra. At five dollars a ton, a fair average price, the proceeds of the ton of plaster, is $100 for not over five dollars cost—a fair profit, certainly. On corn, potatoes and other crops, the showing of profit will not generally be as great as this. But let any farmer experiment with all his crops, and figure the difference of crops on the plastered and unplastered, and he will soon see that he cannot afford to farm it without plaster.

The following is a correct statement of an actual conversation which occurred in April, 1871, in one of the Plaster offices in this city, between one of the proprietors and a farmer who called to purchase a ton of Plaster.

Farmer—What do you ask for plaster?

Proprietor—Five dollars a ton.

Farmer—That is too much; you ought to sell it for four dollars; you would sell a great deal more.

Proprietor—No we wouldn't. If we sold it for a dollar a ton some farmers would want it for fifty cents. No, you ought not to buy one pound less if we charged you twenty dollars a ton than you would at four dollars a ton.

Farmer—Why so?

Proprietor—Because, you make $200 out of a ton of plaster which we sell you for five dollars, and you seem to begrudge us the one dollar which we make on it.

Farmer—Oh, pshaw! that is all nonsense; we make something by sowing plaster of course, but then to talk about our making $200 on a ton of plaster is perfectly ridiculous.

Proprietor—Well now, how much more clover and grass can you raise to the acre by using plaster than you can without it?

Farmer—A ton easy enough.

Proprietor—What is a ton of hay worth?

Farmer—Ten dollars.

Proprietor—How much plaster do you sow on an acre?

Farmer—One hundred pounds.

Proprietor—Now let us see. If you sow one hundred pounds to the acre, a ton of plaster will sow twenty acres will it not?

Farmer—Yes.

Proprietor—Then at a ton extra per acre you get twenty tons of hay for your ton of plaster do you not?

Farmer—Yes.

Proprietor—And you say a ton of hay is worth ten dollars. Then twenty tons brings $200—just as I said. Mind you, you made the figures yourself, I did not. Now don't you think we ought to have five dollars a ton for plaster?

Farmer—(Laughing.) All right, I give it up—give me my plaster.

This is the substance of the conversation and in almost the exact words as it took place.

EXPERIMENTING.

In all cases, in trying experiments to test the value of Plaster as a fertilizer, the experiments should be made upon land upon which no plaster has ever been used. For the reason that Plaster once used upon land, the effects are felt in a greater or less degree for some years afterward, and therefore the test will not be a fair one unless tried upon soil unused to plaster.

CONCLUSION.

It will thus be seen that the weight of authority—scientific as well as practical—accepts the theory of Leibig; that Plaster assists the growth of vegetation chiefly by its capacity or arresting and fixing the ammonia in the atmosphere, and giving it up to vegetable growth. Now, if this is correct, and as "the influence of Ammonia on vegetation is conceeded to be of a very powerful kind, seeming not only to promote the rapidity and luxuriance of vegetable life."* It necessarily follows that Plaster must aid the growth of *every kind of crop and all kinds of vegetation.* It is also apparent, that as a general rule the best mode of application is to apply it directly to the leaves and stems of the plant. Still an application to the seeds and root is good and will pay.

*Johnson's Agricultural Chemistry.

GRAND RAPIDS PLASTER.

The Gypsum or Plaster taken from the mines at Grand Rapids, is unquestionably the best and purest article of the kind which has yet been worked in the United States. It is fully equal in all respects to the celebrated Nova Scotia and in some particulars it is superior even to that. It is deep down from the surface having above it a heavy slate and blue clay covering, besides from twenty to sixty feet of earth thus protecting from the decomposing action of air and water, and preserving all its elements intact. It is also remarkably pure having in the strata worked little or no flint or other foreign substance. Some mines come nearer the surface and have only a gravelly covering. Of course the upper portion is very much decomposed by the action of air and water losing some of its valuable properties and rendering it soft and inferior. We know that surface coal is always inferior and that the purest and best is always found lower down in the bowels of the earth. This rule or law which applies to coal, we suppose applies to plaster as well. But the proof of the pudding is in the eating, and the best evidence of the superior quality of the Grand Rapids Gypsum, is in the fact which can be proved by reliable data, that *three fourths* of all the plaster sold and used north and west of the Ohio river, is from the Grand Rapids beds. And further: Wherever it comes into competition with any other it commands among the farmers who have had experience in its use, from ten to twenty per cent. increased price. If you want the purest and best article in the market, get that mined at Grand Rapids, Michigan, by the GRAND RAPIDS PLASTER COMPANY,

WM. HOVEY, Agent.

Whose mines are perfectly dry and can be worked at any season of the year, with good facilities for shipping via. river or railroads. Also well situated for supplying Wisconsin.

MICHIGAN STATE AGRICULTURAL COLLEGE,
Lansing, March 3, 1876.

Dear Sir: You have written to me asking what are the results of experiments in the use of plaster at this college, and I reply as follows:

Plaster is used on this farm mostly in clovers, and we find great benefits from its use. By reference to experiments in which the influence of plaster on clovers has been tested by *measure and weight* I find plaster has increased the clover crop by *fifty to eighty per cent.* I regard clover as a prime necessity for good farming in Michigan,

but do not see how clover can be grown with the best results without plaster.

At the rate of yield on the state farm, every ton of plaster returns a profit to the farmer of from $100 to $200 at the least calculation.

To obtain the best results, the vines of potatoes should be dusted with plaster as soon as they are fairly through the soil, again immediately after the last plowing and hoeing and at intervals throughout the whole growing season. The first application should be light, the second heavier, and then after that it should be bountis fully applied—say two hundred pounds per acre at one sowing.

It has long been known that sowing plaster when the dew is on or before the fall of rain, gives better results than when sown in dry weather, and the reason is obvious, viz: that the plaster dissolves in part in such rain or dew and this directly aids the plant.

If not sown early, it loses nearly all its value as a fertilizer. It is while the young plant is sending out its first rootlets near the surface of the soil that plaster is of the greatest service; the slight sprinkling of the white dust that is then scattered upon the soil has the effect of seizing upon the volatile ammonia that would otherwise escape into the atmosphere with the rapid evaporation that is so active in the spring season, and by this seizure the earthy substances in contact with the young roots, become fitted to yield up the materials that are so much needed to build up the rapidly developing plants. Hence to get the full benefit of plaster, it must be sown early, and to use it properly it ought to be now in every farmer's barn.

There is no stimulus so cheap and so efficient as at least one hundred pounds to the acre of ground plaster. The way to promote a good growth of clover seed, is to stimulate with plaster the growth of the first crop, and cut it early before any of the strength of the plaster has gone into the production of the flower bloom. The early cutting and the spring growth of the plant stimulated by the plaster, will give the second growth requisite strength to produce and ripen a full crop of seed.

Very Respectfully,
R. C. KEDZIE,
Prof. Agricultural Chemistry.

THE RELATIVE VALUE OF FERTILIZERS.

Extracts from the Grange Visitor, by Col. F. M. Holloway.

We come now to consider the class of fertilizer to which we shall call your attention. This is plaster, or sulphate of lime. Its use with us is more general than all other commercial fertilizers combined. The amount required to the acre will depend much on the

growing crop to which it is applied. It has been fully demonstrated by agriculturists in their analysis of the composition of plants, that an acre of clover that will yield 5,000 lbs. at two cuttings, contains about 120 lbs. of lime; timothy hay about 34 lbs; an average of corn 25 lbs; an acre of wheat that will yield 25 bushels, 15 lbs; an acre of oats of 50 bushels, 30 lbs; potatoes 9 lbs. From this we may see the relative requirements, for but one of the plant foods, that are abstracted from the soil, to produce a crop of the different plants. When we take into consideration the fact that plants feed upon the gasses of the earth, and these generated from definite and known substances, "either vegetable or mineral or both combined," through chemical change, and when we further see that the entire body of pure plaster is but component parts of known substances, viz: 33 of lime, 46 of sulphuric acid and 21 of water, all positively essential in the manufacture of these gasses—we must, I think, concede its value. Certainly no one can deny its value without showing that the soil we till is already charged with all the mineral substances necessary for this work of generation, and that it affords all required for plant food, as well as the waste by drainage and evaporation constantly going on in our cultivated fields. But there is another, an advanced view to be taken in the use of plaster, which is now conceded by those who have given the subject much thought.

Sulphate of lime or plaster has a peculiar disintegrating influence on the compound silicates of the soil, setting free potash and magnesia for the use of the plant. By its use then, we supply the plant with sulphur and lime and give it the means of obtaining an increased supply of potash and magnesia. You understand very well the effect on plants of a good dressing of unleached ashes; you have been applying potash to them. But if you haven't the ashes to apply, try the effect of harrowing or plowing in 300 lbs. of plaster to the acre, and if this does not bring the desired result, you have no hope only in the manure pile until the change comes.

One more thought and I am done. It is the theory held by some that plaster has a powerful affinity for, and does its chief work in arresting the ammonia that is in the air, and applying it to the pores of plants for food.

This is altogether a too superficial view to be taken of its action. It is performing a greater work. That it will arrest and hold in a fixed state all volatile gasses, is very true. Hence its special value on the manure pile when decomposing; that it will hold in check evaporation from plants, in a hot day, is another established fact; hence corn or clover well plastered, will keep green in a burning

sun, while that not plastered is rolled up, wilted and nearly spoiled; that it is one of the most active agents in reducing all carbonaceous substances into plant food, is fully demonstrated by analysis, and by the intelligent use of it on all highly cultivated vegetable soils, as is shown by many trials.

2d. We advocate the use of plaster. Not as a mere top dressing as has been the usual practice, but in larger quantity to the acre, and where practicable incorporated with the soil. I have the best reasons for believing that we would be pleased with the result. That our failures with clover in not catching would be largely diminished, if, when we sowed our wheat in the fall, we would sow from two to three hundred pounds of plaster per acre, and drill it in with the wheat.

All our surroundings point to the farm to supply the deficiency of the farm. We must at least exhaust its resources first. We all agree to this proposition.

Our experience in using clover as a green manure, and the results flowing from it, have been in the past so satisfactory, that we may conclude that the future will very soon develop a very great use of all the leguminous plants, for green manuring. Anything that will grow quick, produce a large bulk of vegetable matter, if desirable. Some will be better than others, as they contain more ash. Were we to classify we would put clover first, millet second, although not strictly of this class of plants, peas third, and buckwheat last. These plants are all "at home," on our soils. They grow quick and revel in a liberal feeding of plaster. One such crop returned to the soil every three or five years, would so increase the vegetable mold as to effect for good the crops of the full rotation.

If we are correct in our conclusions, and we think the testimony of science and experience largely in our favor, we cannot too strongly urge the use of plaster in a scientific way, as a means by which our farms may be made more fertile, and in so doing it will pay. The cheapness of the article and the facilities for obtaining, warrant the farmers of the country in its free use, even to trying experiments with it, not heretofore made.

DIRECTIONS

FOR THE USE OF

PLASTER OR GYPSUM.

In all cases where it can be done the application should be made in still weather when the leaves are damp with dew or fog, or from recent rain, so as to cause the dust to adhere to the plant.

As a general rule the best results will be attained by the application of the plaster directly to the leaves and stems of the plant, as the rains will wash enough of it down to the roots. Still sowing with the seed will pay largely.

RED CLOVER.

When first applied after seeding, the usual method is to sow the plaster soon after the frost leaves the ground in the Spring, about 100 pounds to the acre. Some persons sow more and some less, but we think the experience of farmers generally has shown that upon most soils this quantity is sufficient.

In all other cases, where the clover has a year or more growth, it is generally considered best to sow in the spring when the plant is three or four inches high, as its application to the leaves and stems is highly beneficial, and the rain will wash a sufficient portion of it down to the roots. Many farmers, however, apply it earlier, but we think the best results will be obtained if applied when the plant first starts and then again when about four inches high. Quantity same as before, 100 pounds to the acre.

After the first crop has been gathered great benefits will result from a second application of say fifty pounds to the acre for the second crop. Both the seed and the hay in quantity and quality will be much improved by such application.

THE GRASSES.

The application of Plaster to the grasses should be made in a similar manner as upon clover, about 100 pounds to the acre.

CORN.

Various opinions are entertained by farmers as to the best mode of application of plaster to corn. The common method is to sow it upon the hill soon after the plant is up, say three or four inches, about a table spoonful or a little more to the hill. It should not be dumped in a pile, but scattered over the leaves as much as possible.

It will be better still if another dressing should be given to it after the first hoeing or cultivating, and the plant has attained six or eight inches growth.

Some farmers soak the seed and roll it in plaster and then give it a top dressing after it is up. In some such instances the production has been greatly increased.

Some farmers sow plaster broad-cast over the field before plowing, then again after the plant is up, and claim that they find good results from this course.

Our opinion inclines to the mode first suggested, believing that the rain will wash down to the roots. It is well, however, for each farmer to experiment for himself on his own soil and then he will be able to judge which is the method for his farm.

POTATOES.

Upon potatoes, plaster should be sown upon the hill soon after the plants are up, same as upon corn, about a table spoonful or more to the hill, scattered upon the leaves as much as possible, and then should have at least one more liberal dressing upon the vines after hoeing, and when well advanced in growth.

D. A. Compton, Esq., of Pennsylvania, in his prize essay on the "Cultivation of the Potato," an extract of which will be found in this pamphlet, advocates still a third dressing to be applied later in the season. As in the case of corn it should be applied to the stems and leaves, as the rain will wash a sufficient quantity down to the roots. Good results have been obtained by dropping a handful with and on the seed and cover together.

Plaster is repugnant to all insects and when mixed with Paris Green, one part to twenty parts of plaster, was found last season to be a perfect remedy for the Potato Bug, while at the same time it invigorated the vines. As Paris Green is poisonous, the mixture should not be handled, but should be sifted upon the plant through a fine sieve or cullender, while the leaves and stalks are wet with dew or recent rain, so it will adhere to them. The result is certain death to the bug and not injurious to the vines.

WHEAT.

Upon winter wheat there should be a top dressing of about fifty pounds to the acre in the fall when it comes up, and another like dressing after it has started in the spring. In cases where it has been affected by the severity of the winter, and especially in all cases where it is uneven in growth, with spots nearly killed out, a larger application should be made, full 100 pounds to the acre, and making even a more liberal application than that to the poor spots. The effect will appear marvelous.

Upon spring wheat it should be sown after it is well up—about 100 pounds to the acre.

OATS, BARLEY AND RYE.

Upon Oats, Barley and Rye, the application should be the same as upon Spring Wheat, after they are well up and about 100 pounds to the acre.

Some farmers have after plowing sown a good coating of plaster upon the ground without harrowing, and harrowed it in with their oats, then sowing their clover and claim excellent results from this cause. It is worth a trial.

TURNIPS, BEETS AND OTHER ROOT CROPS.

Upon root crops we would recommend sowing about 100 pounds to the acre after plowing and before harrowing, so as to work it in the soil near the surface—and then give the plants a top dressing, when well started in growth.

FRUIT TREES AND FRUIT.

Upon Fruit Trees and upon all small fruits, plaster should be sown upon the leaves and blossoms while in full blossom. Extraordinary results are claimed by those who have tried it upon the fruits. As in other cases it should be sown when the leaves are damp so it will adhere.

Many fruit raisers in the State of New York, regularly use plaster upon their fruit trees having demonstrated that it improves the fruit and at the same time checks the ravages of insects. They say this is especially the case with apples.

Harry Gilbert, Esq., for many years agent of the Michigan Central Rail Road at New Buffalo, lately deceased, stated that he had a peach tree and a sweet apple tree in his yard, both of which regularly blossomed out for several years but bore no fruit. One day returning from plastering his corn with a half a pail of plaster a thought struck him to throw it upon the trees which were then in full blossom. He did so and the result was a full crop of fruit. A

repitition of the experiment each year had never failed to bring him a good yield of both peaches and apples.

TOBACCO AND COTTON.

Upon Tobacco and Cotton the applicalion should be made after the plant is well up and has say four or five inches of growth, as in other cases it should be sown upon the leaves and stem of the plant in a moderate quantity of about 100 pounds to the acre. A second dressing later in the season will be a great benefit.

GARDEN VEGETABLES, PLANTS AND FLOWERS.

Upon all Garden Vegetables, and upon all plants and flowers, Plaster exercises a beneficial influence increasing their growth and repelling insects. Frequent applications of it as after every shower so as to keep the vines white with it will drive away the striped bug from cucumber vines. There is no plant which grows which will not be benefited by its use. The application in all cases under this head, should be made several times during the season upon the leaves of the plant, but a light dressing.

MANURE HEAPS.

As ammonia is the most valuable component of all vegetable and animal manure, it being very volatile, readily escapes upon exposure to the atmosphere. No farmer can make a better appliction of Plaster, than by scattering it thickly in his hen house, upon his manure heaps and about his stables wherever there is any manure as it readily absorbs the ammonia preventing its escape. A few barrels of it should be kept constantly on hand for such use. He will save more than half the value of his manure by a proper use of Plaster in this way. Beside saving the valuable portions of manure it purifies the atmosphere making it healthier for man and beast.

If any farmer doubts the effects, as here stated, it will cost him but little to test it. Let him sow one, two or five acres of Grass or Clover, with Plaster, and leave the balance of his field without it, and if the yield is greater on the plastered part, let him figure up the difference in the increased production, against the cost of the Plaster used, and he can soon tell whether it will pay to use plaster. He can try the same experiment on his corn and other crops. It is not expensive to try it, it will pay.

Please Keep this Book for Reference.